THE MED

MODERN

P. J. FOS

ANTIQUIT

speaking, th
ly, however,
arried on a
the do
of incre
ed fr arliest
v. t
mentary
version of the
ated to have oc
papyri, too,
an epidemic
the time of
given by H
pestilence w
s relating

E

VIII. N

JN 1803 2.

THE MEDICAL MAGAZINE.

NOVEMBER, 1899. VIII

ROYAL COLLEGE OF SURGEONS OF ENGLAND

MODERN EPIDEMICS: PLAGUE.

BY J. FOSTER PALMER, L.R.C.P., etc.

ANTIQUITY, DURATION AND EXTENT.

[illegible]ICTLY speaking, the plague is an ancient epidemic. Un[illegible]tely, however, old as it is, and long as has been the s[illegible] carried on against it, it has only been partially subdue[illegible] at the close of the nineteenth century is again showi[illegible] of increased activity. Plague has no doubt existed fro[illegible] earliest times of which we have any record, extending, [illegible], to the prehistoric ages. In one of the fragmentary [illegible] attributed to Manetho, the Egyptian historian of the [illegible] century B.C., an extensive epidemic is stated to have o[illegible] in Egypt about the year 2500 B.C. Certain papyri, too, [illegible]oint unmistakably to the annual appearance of an epidemic following the inundation of the Nile as early as the time of the shepherd kings.* The sanitary certificate given by Herodotus, too, is discounted by the wide-spreading pestilence which took place shortly after his visit. In all records relating to this same region of the world we constantly come upon accounts of pestilences which are, at least, consistent with the prevalence of an intermittent endemic of plague about the shores of the eastern part of the Mediterranean for many thousands of years. Of the accounts in the Old Testament Scriptures some of the ten plagues of Egypt,* notably the "boils and blains on man and beast," and perhaps also the sudden death of the first born, are suggestive of Pestis Inguinaria. Still more so are the plagues recorded as occurring among the Hebrews in the wilderness,† the mortality of 70,000 men in three days in Palestine in the reign of David,‡ and of 185,000 Assyrians in the camp of Sennacherib at the campaign against Jerusalem.§ The same may be said of those described by Homer in the *Iliad*‖ and by Ovid in the *Metamorphoses*.¶ The plague of Athens, 435 B.C., described by Thucydides,** is clearly identical with what we understand as plague, and subsequent accounts leave still less room for doubt. In the year 250 A.D. a record pestilence attacked the human race. The Romans having conquered the known world, were lapsing into idleness and luxury; their energy and resisting powers had declined, while the causes which had induced the spread of disease remained as potent as ever. Speaking of this epidemic, Gibbon says, "Could we venture to extend the analogy (of Alexandria) to the other provinces, we might suspect that war, pestilence, and famine, had consumed, in a few years, the moiety of the human species".†† To the epidemic which took place three centuries later (A.D. 545) he refers thus: "The triple scourge of war, pestilence and famine, afflicted the subjects of Justinian, and his reign is disgraced by a visible decrease of the human species, which has never been repaired in some of the fairest countries of the globe".‡‡ The description of the disease, as given by Gibbon, leaves no doubt of its nature.* It is identical with that of the plague which ravaged Europe in the fourteenth century, was a more or less constant visitant to these and other shores from the seventh to the seventeenth, and is now prevalent in China, India, Turkey and Egypt. In importance up to this period it leaves all other diseases far behind. If we take all the epidemics on record from the beginning of the sixth century, when the accounts of plague are clearly distinguishable, to the end of the seventeenth when it began to decline, the percentage of plague is 84·19 per cent. After this epidemic (545 A.D.) an extension must have taken place in the distribution of plague, for in 664-5 A.D., just 1000 years before the last great English epidemic, it first receives special notice in the British Chronicles. This must have marked the commencing ascendency of a gigantic plague-wave which overspread Europe for 1400 or 1500 years, and then fell back for a time within its former limits. It is spoken of as the yellow plague, and is described by Bede, Nennius, the Anglo-Saxon and Ethelwerd's Chronicles, and by Geoffrey of Monmouth with his usual exaggerations.† The culminating point of the plague-wave, however, was the black death of A.D. 1349, which is estimated by Hecker to have carried off 25,000,000 of the inhabitants of Europe. Hecker's account appears at first sight to be grossly exaggerated, yet it is not without some confirmatory evidence. He states that one-fourth of the population of the world died in four years, and gives the mortality in England at *nine-tenths* of the population. The French historians give this same figure, nine-tenths, as the mortality of certain French towns, and two-thirds for some of the provinces. Hume‡ and Wright§ both give a general estimate of one-third, and the Book of Pleas at Norwich gives four-fifths for many places. Hecker credits China with 13,000,000 deaths, and other Asiatic countries with 23,840,000;

---

* *Melanges Egyptologiques*, par F. Chabas, à Châlon-sur-Saône, 1862.

---

* Exodus, vii.-xii. † Numbers, xi., xvi., etc. ‡ 2 Samuel, xxiv.

§ 2 Kings, xix. ‖ Book i. ¶ Book vii., fab. 5.

** *Bello Pelop.*, lib. ii.; Lucretius, lib. vi.

†† *Decline and Fall of the Roman Empire*, vol. i., ch. x., p. 456.

‡‡ *Ibid.*, vol. vii., ch. xliii., p. 423. Gibbon suggests 100,000,000 in place of the obviously mythical 1,000,000,000,000 apparently indicated by Procopius.

---

* *Decline and Fall of the Roman Empire*, vol. vii., ch. xliii., pp. 419, 420.

† Ethelwerd speaks of an epidemic among the birds, and Geoffrey attributes the success of the Saxon invaders to this pestilence, which, he says, nearly exterminated the Cymric race in Britain.

‡ *History of England.* § *History of France.*

many large districts were entirely depopulated, and numbers of ships were seen drifting about with no living soul on board.* From this time, however, the incidence of plague, although still very formidable, slowly but steadily declined. It had "touched the highest point of all its greatness". For 300 years it remained endemic, but with diminished power. At the latter part of the seventeenth century it left this country (for ever, as we had fondly hoped, but in view of present events we must speak with caution), and then gradually receded towards its original haunts in the dominions of the Sultan of Turkey. The total epidemics of plague in the fourteenth century (including the black death) was about 55, in the fifteenth 82, in the sixteenth 127 and in the seventeenth 144. The prolonged epidemic of 1348 (the black death) is said by Hecker to have been preceded by vast atmospheric disturbances on a universal scale. Earthquakes were constant throughout Asia and Europe. Meteors and comets were seen in abundance. The floods and torrents of rain were so great that mountains were washed down by them. And these were alternated by lengthened periods of drought. Such preliminary disturbances are all beyond human control. These precursors, together with the actual length of the plague-wave, about 1500 years (from the second or third to the eighteenth century) as a general European epidemic, and 1000 years (from the seventh to the seventeenth) in the British Isles, which would be practically its north-western limit,† all point to the origin of this disease in cyclical rather than in accidental or preventable causes.

The great plague of London (1665 A.D.) marks the fall of the plague-wave as it affected this country. It was undoubtedly a terrible visitation; but it bears no relation, in point of magnitude and extent, with the black death of the fourteenth century. The population of London was, of course, considerably greater. Yet the highest estimate gives only 100,000 deaths, the same as the earlier epidemic. The more usual estimate, however, is 68,596. In the earlier epidemic, too, many other towns suffered to a similar extent, and the total mortality was immeasurably greater. The plague of London was preceded, according to many observers, by a comet, swarms of frogs, of flies, ants and other insects, and by a prolonged drought.* The mortality began in May and lasted about six months, reaching its highest point in the third week in September, after which it gradually declined. The further recession of the plague was marked by the epidemic of Copenhagen in 1712, and that of Marseilles in 1720. In this epidemic a third of the population of Provence and other districts is said to have perished. During the next hundred years occasional outbreaks took place in Russia, in the Spanish and Italian peninsulas, and some of the islands of the Mediterranean, but since the early years of the present century the plague has been, so far as Europe is concerned, chiefly confined to Turkish territory.

---

* The Queens of France and Navarre, the Duchess of Normandy, the Duke of Burgundy, Petrarch's Laura, and Villani the historian, all died of this epidemic. Boccaccio's tales are founded on it.

† Plague is said to have been actually introduced into Europe in A.D. 167, by the army returning from the Parthian war. The first great epidemic described by Gibbon, however, began about the middle of the third century. In Britain, too, plague broke out at intervals in the early centuries during the Roman occupation, but the first epidemic to decimate the entire country appears to have been that mentioned by the chroniclers as occurring about the middle of the seventh century.

GENERAL HISTORY AND ORIGIN.

In its earlier manifestations the plague would appear to have been endemic in Egypt, and to have been in some degree dependent for its prolonged activity on the periodical overflowing of the Nile. After the lapse of 4000 years the disease is still more prevalent in the period following these inundations. This suggests that the decomposition of animal and vegetable matter is especially favourable to the development of the plague-bacillus. The subsidence of the inundations leaves the land covered with such products, for which the river had been a universal receptacle. Besides this, all the great epidemics we hear of were preceded either by war or by fatal disease among cattle. In both cases dead bodies are left unburied in large numbers, and the air is filled with the products of animal decomposition. Decomposition will not alone, of course, generate plague, but where the bacilli exist it will greatly increase their fertility. Plague occurred in Persian Kurdistan in A.D. 1863, at Bengazi in A.D. 1858 and again in A.D. 1874. All these epidemics were preceded by animal pestilences, as the result of which the number of dead cattle was so great that they were practically all left unburied. The epidemics, too, that we read of in the Old Testament and in the *Iliad* of Homer, were all connected with military operations. In the fifth century B.C. the wars of Pericles were brought to an impotent conclusion by the plague of Athens, and two hundred years later the conquests of Demetrius Poliorcetes in Armenia were also put a stop to by pestilence among his troops. The wars which made Rome the master of the world were followed by the great outbreak, already referred to, of the third century. Those by which she was compelled to defend that position against her northern invaders were followed by another, equally extensive and fatal, in the sixth century, in the reign of Justinian. The first outbreak in the British Isles was in 664-5 A.D., during the latter part of the Saxon invasion, when civil wars and massacres had been for a long time the normal condition in every part of the kingdom. The outbreak of 1314 A.D. followed upon the Scotch wars of Edward I. and Edward II., while the greatest outbreak of all, the black death of 1348, was preceded in this country by civil war, by war with Scotland and with France, as well as by a long series of struggles in the Holy Land, one of the countries near which plague had its origin.* In the seventeenth century there were twelve epidemics of plague in this country, and fourteen in Holland. The beginning of that century saw the thirty years' war and the civil wars between Charles I. and the English Parliament. Civil war has practically ceased in England since the middle of the seventeenth century, and plague has ceased with it. The plague of Copenhagen in 1712 followed the invasion of Denmark by Charles XII. of Sweden; that of Marseilles in 1720 the wars in France and Spain. During the present century plague has followed every attack upon Turkish territory by Russia, and it has been only on such occasions that it has spread beyond its normal geographical limits. It broke out after the Bulgarian War in 1828, after the Crimean War in 1855, after the Russo-Turkish War of 1879, and again showed its mark on the mortality of the English troops after the more recent operations in Egypt.

---

* Walford, *Chronology of Pestilences*, p. 108. It may perhaps be noted that in the account of the ten plagues of Egypt a somewhat similar sequence is observed; a drought, and then swarms of frogs, flies and other insects, followed by an animal pestilence, preceding the plague of boils and blains, and a further invasion of orthopterous insects preceding the death of the first-born. Both ancient and modern accounts point to all these as frequent precursors of plague. In Asia certain flies which often precede the plague are called plague-flies.

Plague, so far as we can judge, presents somewhat the same features, is due to the same causes, and is followed by the same results now as it was four thousand years ago. If there is any difference, it would appear, as might be expected, that the earlier epidemics were, in proportion, more acute and more fatal than those of later times. Comparing two well-known instances, one remote and one recent, that recorded in 2 Samuel xxiv. as occurring in Canaan in 1017 B.C. and the plague of London in 1665 A.D., we find that the former is said to have destroyed 70,000 people in three days,† the latter to have been fatal to about 38,000 in five weeks. This, however, may be considered to indicate the decline of the disease following its climax, for in the accounts of the black death of 1349 A.D. we find very different figures. In this epidemic 37,000,000 deaths are attributed to the plague in Asia, and in Europe a number equal to about one-third of the entire population. Regarding the history of plague as a whole, it would seem to have attacked mankind with gradually increasing severity until it culminated in the black death of 1349 A.D., and then to have declined with comparative rapidity. Since the beginning of the eighteenth century the percentage of plague epidemics to the total number of epidemics has dropped from 69·32 * to 21·03.† In the seventeenth century it was still as high as 60.

---

* Palestine has frequently been visited by plague, probably from the Mesopotamian centre on the Euphrates. Or it may have come from Egypt, where in earlier times it was more prevalent than it is now.

† These figures, enormous as they seem, may be considered as fairly representative; they agree with those of other records of the same period. An epidemic in Spain in 1100 B.C. (Walford, *Chronology of Pestilences*) is said to have destroyed 70,000 in three days; another in Rome in 717 B.C. 50,000; another to have destroyed the Assyrian army at the siege of Jerusalem in 710 B.C. to the number of 185,000; another in Greece, in 780 B.C. destroyed 150,000 soldiers in the army of Mardonius, and the same number of deaths is said to have taken place in Sicily in 394 B.C. In Rome in 366 B.C. 10,000 citizens are said to have died each day while the pestilence was at its height.

CONTAGION AND INFECTION.

Is the plague contagious? We have been told with confidence that it is not. Such a position, in view of modern bacteriological research, is untenable. But, on other grounds, although the disease may not depend solely on contagion for its propagation, the evidence in favour of its non-contagiousness was never conclusive. A writer of the early part of the present century ‡ speaks of the non-contagion theory as a periodical mania which breaks out every few years, and originates in a desire to repeal the quarantine laws. The establishment of quarantine was certainly coincident with a diminution of plague in Europe. Whether they bore the relation of cause and effect must be a matter of opinion. Since plague has been only an occasional visitor, every outbreak in Western Europe has been preceded by the arrival in the place where it originated of a plague-stricken vessel, and in two instances—at Marseilles in 1720 and at Malta in 1813—the first families attacked were

---

* This is including all the recorded epidemics from the earliest times to the year 1700 A.D.

† From 1700 A.D. to 1882 A.D.

‡ Dr. Russell: quoted by the translator of Gooch's article on the "Plague," New Sydenham Society, 1859.

those of smugglers. Such persons we should naturally expect to be among the first to visit a newly arrived vessel, and would be under a special necessity not only not to publish the fact, but to take every precaution to keep it quiet. When we consider how often, how long and how successfully, smugglers used to elude the practised vigilance of excise officers, it is not surprising, as Gooch observes, that they should be able to mystify a few collectors of statistics.*

Sir James McGrigor and Baron Larrey appear to have considered the plague contagious but not infectious. Of modern observers, Dr. Cabiadis of Russia considered it infectious but not contagious. Prof. Virchow of Vienna, I believe, has held the same view. The late Mr. Radcliffe believed it to be neither contagious nor infectious. But all agreed that the actual causes were unknown, that starvation and drunkenness increase the liability to the disease, and that therapeutic treatment is absolutely useless. To these last dicta we may still subscribe.

If a disease can, in however small a number of cases, be communicated from the sick to the healthy, full precautions must be taken against its communication. Whether the cases so conveyed are few or many is a matter of degree, depending on various causes, the nature of the disease, the soil suitable for its development, the surrounding conditions, and the respective receptivity or resisting power of those subjected to its influence, but does not regulate the necessity for preventive measures. The thorough-going methods of Peter the Great, who hanged every one that passed his cordons, and intercepted, copied and burnt all letters, were remarkably successful in checking the spread of the plague.

---

* It is said that in the early part of the present century an Italian doctor invented an infallible quack medicine, which he recommended to all his patients. It was composed of scrapings from the skin of plague patients mixed with oil, and was employed as an experiment to demonstrate the non-contagious nature of plague. It did not demonstrate it, for many of his patients died of the disease. These diabolical experiments were made in Constantinople, and the druggist who sold the ointment was beheaded for murder. The doctor by some means escaped scot free, and subsequently died of yellow fever in the West Indies, where he had gone to investigate it. His name is given by Gooch (*Works of Dr. Robert Gooch*, edited by Dr. Fergusson, published by the New Sydenham Society, London, 1859, p. 213).

If plague is contagious or infectious only to a very limited extent the convection of a single case may still form the nucleus of an epidemic, although all the subsequent cases may have originated in some other manner.

So long as there is any possibility of doubt on the subject it is certainly safer to accept contagion as one of the causes of the disease. As Gooch pertinently remarks: "Considering the terrific nature of the disease, one would suppose that the bare possibility of its being contagious would induce us to act on that supposition, and that men would lay down as a maxim, 'Take it for granted that it is contagious till you are certain that it is not'". Such certainty we have not yet attained. On the contrary, recent bacteriological research has shown by direct experiment, as well as by the unfortunate experience of Vienna, that the plague bacillus is communicable, even after isolation.

RECENT DEVELOPMENTS.

During the last twenty years plague has again been "en evidence," and we can no longer afford to ignore its existence. In 1875-76 it was resuscitated in Mesopotamia, giving rise to considerable alarm, and spreading thence to several out-lying regions. In 1879, again, it spread through the southern parts of Russia, chiefly in the regions round the Volga, as far as Nischni Novgorod. On this occasion it is said to have been introduced into Russia by Cossacks returning from the war. The first victim was a girl to whom a Cossack had given a shawl which he brought from the seat of war. The disease spread to the rest of the family, and then to the surrounding neighbourhood, destroying half the inhabitants. The principal symptoms in this epidemic were headache, fever and glandular swellings, carbuncles and large petechiæ. It was preceded by an epidemic of a milder type, but probably of the same nature. Pneumonia was also a prominent and dangerous symptom in many of the severer cases. This symptom, which is also mentioned in the accounts of the black death of the fourteenth century, is important as pointing, if not to any definite relation, at any rate to a certain degree of parallelism with influenza and epidemic pneumonia on the one hand and typhus on the other. Indeed, plague, when it breaks out in Russia or other countries where typhus is endemic, is commonly mistaken at first for the latter disease.

Still more recently plague assumed an active form at Hong-Kong. It had been prevalent for some years in Kwang-Si and Kwang-Tung, the two provinces on the south coast of China, and was, no doubt, carried to Hong-Kong by the steamers from Canton. This is a long distance from the natural home of the plague, but there is practically no doubt that it travelled eastward and reached Kwang-Si from the more westerly province of Yunnan. It is sometimes assumed to have come to Yunnan from Annam on the south, but more probably it travelled through Thibet, possibly coming from the Thibetan centre.

This epidemic, although it did not exhibit the potency and danger of plague in the same degree as did those great European epidemics of earlier times, when it travelled far into temperate regions, has shown us that the disease is by no means extinct, perhaps indeed only latent, and that even a small island under British rule, and able to avail itself of all the knowledge and experience of modern sanitary science, is not exempt from its invasions.

The plague epidemic at Hong-Kong has been instructive in many ways. In the first place it confirms what I have long insisted upon as to the impotence of disinfectants in the presence of an epidemic. Hong-Kong was literally drenched with disinfectants of the most approved type. Yet the disease lasted from the beginning of April to the end of July, and then died out of itself, when all the susceptible people had either succumbed or run away.* Not only this, but all the other sanitary measures were futile, as they ever will be when delayed until the plague has entered upon its career of destruction. Carried out, as these measures were, with all the energy and thoroughness of the dynamic Briton, the plague continued to pursue the even tenor of its way unaffected by them, and simply passed away when its work was done, just in the same manner, and at about the same time, as in the populous and crowded city of Canton, where the sanitation was in the lethargic hands of the slow-moving Mongolian. The disease must have begun somewhat earlier in Canton, but when we consider the great difference in population, and the greater length of time an epidemic continues in proportion to its population, Canton, in point of duration, seems to have the advantage. With regard to the actual proportion of cases, the population of Canton is such an absolutely unknown quantity, and the exodus of Chinese plague patients from Hong-Kong so great, that all figures on the subject are misleading. About 100,000 people died in Canton and 2000 in Hong-Kong, but as most of the Chinese patients left Hong-Kong for China, this may represent only a tenth part or less of the total mortality. Whether or not an epidemic of plague may be entirely averted by a series of sanitary measures continued through a long period, the foregoing facts point to the conclusion that in the actual presence of an epidemic all such measures are useless. The number of cases may, perhaps, be lessened in some degree by attention to the purity of the air and water, and other special precautions, and a few individuals may escape by leaving the infected town, but the duration of the epidemic will not be greatly affected. General sanitary measures are invaluable as a preparation for meeting a future invasion, but they should be carried out "in fair weather," and not in the midst of an epidemic. When the plague fastens in an epidemic form upon any town beyond its normal endemic area, that town has been guilty of some long-standing sanitary sin, and the disease can no more be arrested in its course by artificial means than a patient attacked with small-pox can be suddenly restored to health by swallowing a few drugs or breathing oxygen.

---

* *Vide British Medical Journal* for September, 1894, p. 539. The bulk of the Chinese population, it appears, made tracks for China.

The sanitary sins of South China are not difficult to trace, and the sequence of events is sufficiently obvious. Overcrowding is the normal condition of Chinese life. With a mediæval system of drainage and an equally primitive water supply, the country was fully ripe for an epidemic when the drought of the winter of 1893-4 A.D. came to accentuate all the evil conditions. A dry season acting on insanitary surroundings offers an opportunity, a temptation, which an epidemic could hardly be expected to resist. The air becomes impregnated with the products of evaporation, rendering it a most suitable medium for the convection and development of pathogenic microbes. At the same time impure water becomes doubly so, being concentrated by evaporation and deprived of its sources of dilution. Following this condition there comes a pestilence (probably the plague) affecting the lower animals, which still further increases the pollution of the atmosphere and its fitness to become a vehicle for the conveyance of disease to man.

The old familiar factors of epidemic etiology, overcrowding, and the decomposition of animal and vegetable matter, are thus again conspicuously to the fore. On the other hand, the exceptions are equally striking, and, in the true sense of the expression, "prove the rule," and show the value of antecedent as distinct from *ex post facto* sanitation. The island of Shamien, inhabited chiefly by white people, drained and ventilated on approved European principles, and the atmosphere not deteriorated by overcrowding or decomposition, escaped the epidemic. Another exception was the water population, amounting to nearly a quarter of a million. Those living habitually on the water, as well as those who made it their temporary home, also escaped. On water there is necessarily freer access of air and less impregnation than on land, and any danger of earth emanations is, of course, avoided, Microbes which have been absorbed by the surface soil may rise again into the air when evaporation takes place, whereas at sea they would be disintegrated and rendered harmless by the large volume of water into which they are received.

(*To be continued.*)

ANCIENT IRISH MEDICINE: ITS CULTURE AND PRACTICE.

By THOMAS MORE MADDEN, M.D., F.R.C.S. Ed., M.A.O. *Honoris Causâ*, Royal University; Obstetric Physician and Gynæcologist, Mater Misericordiæ Hospital, Dublin, etc.

PART II.—ANCIENT MESMERIC AND ALLIED PRACTICES IN IRELAND.

(*Continued from page* 682.)

THE revival of a credence in the therapeutic efficacy of hypnotism, or by whatever other name the recrudescence of animal magnetism, mesmerism or healing by suggestive will power may be now termed, is a matter of some interest in connection with the subject of the present contribution. In such methods are traceable one of the numerous exemplifications of the Psalmist's words: "All knowledge is but oblivion," which (owing to the too general neglect of ancient medical literature) are so frequently afforded by the resuscitation of old theories and practices under new forms and nomenclature as modern discoveries. Thus amongst the oldest of those Gaelic traditions to which I have before alluded, there are evidences that arts of a distinctly mesmeric or hypnotic character were employed in Ireland in pre Christian ages to produce a clairvoyant trance; whilst at a much later, but yet remote, period the treatment of disease by faith-healing or suggestion was, as will be here shown, for a time successfully practised in this country.

MODERN EPIDEMICS: PLAGUE.

By J. FOSTER PALMER, L.R.C.P., etc.

vol viii

(*Concluded from page* 895.)

In the early autumn of 1896 a far more extensive and important epidemic commenced on British soil, and has continued its annual visitations.* During the years 1897 and 1898, 30,000 deaths took place in Bombay city and 117,000 in the Presidency. Many towns have since been attacked, but none, it would appear, so early and so persistently as Poona, about 120 miles from Bombay. Plague in the present day appears to have three principal geographical centres, a Chinese, a Turkish and an Arabian, to which Koch has added a fourth in East Central Africa. Hong-Kong and Bombay probably received the infection from the Chinese or Thibetan centre on the higher portions of the bed of the Yang-tse-Kiang. Poona no doubt received it from Bombay, which also infected most of the other towns on the line of railway to Bangalore. In February, 1898, there were 1257 deaths in Bombay city in one week. The weekly death rate rose from 95 in December, 1897, to 1283 in March, 1898, and then declined. In June the death rate became normal. In August the epidemic again increased, reaching 243 deaths per week at the end of October, sinking again in November. By this time, however, the deaths had reached, in the whole Presidency, 5000 per week. It now continued to decline. At the beginning of the year a fourth epidemic occurred in the city, the deaths being 150 per diem. In March it declined, and continued to do so till the end of August. In November it increased again owing to the failure of the monsoon rains. Up to 1st February, 1899, the total number of cases was 36,381. At Poona, from January to May, 1897, there were 1500 deaths; from August, 1897, to April, 1898, 3633. At the beginning of January, 1898, 400 deaths were occurring daily. By the end of February it had nearly disappeared. In October it returned, fifty deaths occurring daily, and continued to spread throughout the summer of 1899, while it was declining in every other part of India. By the middle of September the death rate was 110 daily. A week later it had suddenly subsided without apparent cause, but had broken out again before the end of the month. The death rate in these outbreaks was similar to that usually observed in this disease, 90 per cent. at first, falling to 70 or 60 per cent at a later period.

---

* The figures relating to this epidemic are taken chiefly from the reports in the *Lancet* and *British Medical Journal*.

In the middle of the seventeenth century the present city of Bombay was a group of islands with about 10,000 inhabitants. Each island was washed with tidal waves, and was presumably healthy, for water in a constant state of agitation is not favourable to the development of pathogenic microbes. The enterprising Briton, however, changed all this. The outlets were closed; the health-bringing waves were converted into stagnant pools, which, constantly accumulating organic particles, soon became an excellent culture medium for the microbes of cholera, dysentery and various fevers. Bombay gained an evil reputation before the end of the century, was considered fatal to Europeans, and was called the "Indian Golgotha". At this period, about 200 years ago, plague, too, was rife, but for some reason seems to have practically disappeared until the present epidemic of 1896. There must have been some improvement in sanitation taking place during the gradual growth of the city, which at the present time has a population of 800,000. It is equally certain, however, that recently sanitation has not kept pace with the growth of the population, for until a few years ago the city was practically surrounded by a moat of decomposing sewage and excrement. The greater part of the town is so near the sea level that a natural fall is impossible, the annual rainfall is 80 inches, and the sewers were constantly overflowing. Under these circumstances the only wonder is that plague delayed so long. An extensive sanitation scheme has been carried out, but a more perfect and rapid system of drainage is still needed. Even in dry weather there is a mass of polluted water just below the surface, and overcrowding is rampant.

At Poona, a town with a population of about 100,000, plague has more than once continued to increase while declining in all other parts of India. Here the sanitary conditions seem to be those of Bombay exaggerated. The sewers are exposed and the streams traversing the town are practically full of sewage, while the provisions for the disposal of excrementitious material can only be summed up by the classic description of Ionian freedom, *χέζ' ὅπου θέλεις*.[*]

Here, as might be expected, active sanitary measures carried out during the epidemic had little or no effect. The plague simply stayed when it had done its work. In Satara, too, chemical disinfectants were found useless. On the other hand, in the village of Neginhal, with about 3000 inhabitants, where no sanitary measures were attempted, the disease ended spontaneously.

This epidemic, although spreading to other parts of India, was chiefly confined to Bombay Presidency, in which, up to the beginning of February, about 195,000 cases had occurred, against 30,000 in other parts of the country. The mortality was about 90 per cent. of the entire number.

It is to Bombay Presidency, therefore, and especially to Bombay City, that attention must be directed. There have been outbreaks in various parts of China, and also certain alarming signs of progress westward, but they have been important on account of their geographical position rather than their magnitude. A few cases occurred at Jeddah, and it was feared that an epidemic would take place after the Mecca pilgrimage. But nothing happened. The pilgrimage took place with the usual disregard of sanitation,* but neither Jeddah nor Mecca seemed disposed to favour an extensive outbreak in spite of special encouragement to entertain one. Mecca seems to have more affinity for cholera. Thirty thousand pilgrims died of the latter disease in 1847.

---

[*] Applied by Strabo especially to the island of Corcyra (Corfu).

Of more importance as indicating a tendency to spread westward was the occurrence of plague at Alexandria. It could hardly be called an epidemic, only forty-two deaths having taken place by the end of August, 1899. But Egypt was a plague country in olden times, and plague was rife in Alexandria from 1834 to 1843, being most prevalent in March and April. At the beginning of July, 1899, it was thought to have been exterminated by active sanitary measures. House-to-house visitation, segregation and isolation of patients, disinfection and emptying of infected houses, were rigidly carried out, but nevertheless fresh cases occurred, and it was still going on in the middle of August.

Still more alarming to Europeans was the actual occurrence of plague cases in Portugal. Inspection and notification have to some extent prevented its spread, but the plague still continues. This is practically the first outbreak in Western Europe during the present century. It shows that, as far as Europe is concerned, plague is not extinct but only latent, and that sanitary defects in any country might be followed by a severe epidemic. In Oporto there have been at present seventy-five cases, of which thirty were fatal.* In Hong-Kong, the plague, too, still continues. The death rate was highest in May, when it reached 134 per week. The epidemic here was again preceded by a long drought. The present death rate is sixteen per week.†

---

* A graphic description of this pilgrimage was given by Otto Herman in the *Deutsche Versicherungs Zeitung* in 1877. After describing the crowded procession of pilgrims afflicted with leprosy and every species of contagious disease, he proceeds: "When the procession arrived at the shrine the *ne plus ultra* of horrors began. A prayer having been offered, infected lips imprinted a kiss in turn, first upon the pedestal of the image, then on the face, the feet, and so on; the lips of the well touched the same places. The next day I found a *brown crust half a millimetre in thickness*, which had been formed by the kisses. The basin of the holy fountain, which contained 10 or 15 litres of water (about three gallons), presented a still more disgusting spectacle. All the pilgrims washed themselves in this same water, people with ulcers, caries, and limbs which had already begun to mortify, all used the same 15 litres of water. Mothers with children in their arms stripped them and bathed them in the water from the crown of their heads to the soles of their feet" (quoted in Walford's *Chronology of Pestilences*, p. 31).

Human knowledge is very limited in potentiality. Four thousand years' experience of plague crowned with abundant bacteriological research has not taught us yet how the disease is actually and usually conveyed. Whenever we hear it proclaimed with a flourish of trumpets that the plague has been exterminated in any city or town by the activity and completeness of the sanitary measures taken, we have only to wait a few weeks, and we usually hear again of a recrudescence on a larger scale. The inference appears to be that while one avenue is blocked another is left open. Much time has been spent in proving, or trying to prove, negatives. The old non-contagion mania has broken out again in face of the actual presence of the Kitasato bacillus. Experiments have been made to disprove the convection by grain theory, so ably advocated by Colonel Waters. Some see no cause but filth, ignoring the fact, also referred to by the same writer, that the plague bacillus will, like the bacilli of typhoid and cholera, increase and multiply in pure water. Others, again, fail to recognise the importance of decomposition and overcrowding because they have sometimes failed to bring about an epidemic. Both are simply predisposing causes. They increase the organic matter in the air and form a culture medium, into which, if introduced, the plague bacillus will certainly tend to flourish. The mass of evidence of all ages shows that their influence has been great, and an occasional failure will not invalidate the position. There may be other important factors wanting. It is fatal to neglect any.

---

* 24th September, 1899.

† Drought is a very constant precursor of plague. It was both in Bombay and Poona, and is always a recognised factor of the disease in China and Japan. A heavy rainfall is beneficial. It was quiescent during the monsoon rains in Bombay.

That infection may be conveyed in clothes the present epidemic in India has fully confirmed. Several of the local epidemics and recrudescences have been traced to this source, in some cases after the lapse of several weeks. Plague bacilli, indeed, have been found by one observer in disinfected clothing. Similarly the plague in Malta in 1813 is traced by Gooch to the removal of cloth from a plague-stricken vessel to the house of a smuggler;* the spread of that of Moscow in 1771 to a military clothing factory; that of Marseilles in 1720 to a similar origin.

That the plague can be conveyed by direct infection from one human being to another, from animals to men, even from animals artificially inoculated,† is proved to actual demonstration by the cases of Barisch, Nurse Pecha and Dr. Müller at Vienna, as well as by the spread of the disease in many towns in Bombay Presidency after the admission of people from infected centres. Such facts being once fully recognised, it is dangerous to ignore them in favour of some other favourite theory. We cannot ignore human intercourse as one of the means by which plague is spread because sometimes it is carried by other channels. Plague is not limited to a single mode of travelling. We know that in this instance it was actually conveyed from mice to men. This at least gives credibility to the numerous older records which connect the plague with animal pestilences occurring before or concurrently with it,* as well as to the statement of Prof. Koch that the plague, whether in Africa, India or China, is almost invariably preceded by an enormous mortality among the rats. Koch, indeed, considers plague as primarily a rat disease, while Simond † carries this theory a step farther. He considers, as the result of his experiments, that the disease is carried by rats and is found to follow their migration; that it does not usually spread till it has had time to develop among the rats; that it is communicated from rats to rats, from rats to human beings, and from these to one another, not by the mouth, but by the skin and by means of insect parasites.‡ The positive evidence on this subject is by no means nullified by the occasional absence of this source of infection, by the fact that only one rat affected with plague was found at Alexandria,§ that the destruction of a large rat population in Bombay did not cause the immediate cessation of the first epidemic, nor prevent the occurrence of a second, and that Hankin found a limit to the reproduction of the bacilli after a certain number of inoculations.

---

* "The parties, be it remembered," says Gooch, "are a crew under quarantine and a cunning smuggler, both under penal restrictions which they daily and hourly, but of course secretly, elude by frauds and falsehoods. What other evidence of communication between such people are we to expect, unless the devil on two sticks had been employed as a spy, and from his lofty station, at night, had actually seen the piece of cloth conveyed from the *San Nicolo* into the boat, from the boat to the shore, from the shore over every inch of ground till it arrived at Borg's house, and then observed the unfolding of the cloth and the escape of the contagious vapour?" (*New Sydenham Society's Transactions*, vol. ii., p. 205).

† This occurred also in Cochin China, where it spread from the mice employed for experiment in the Yersin Laboratory. It was supposed to be conveyed by ants in this case.

---

* *Vide ante*, p. 3. In the *Baganathi Purana,* too, one of the old Hindu sacred writings, this danger is indicated, and people are warned to evacuate their houses when rats are found dying in large numbers (*vide The Bubonic Plague*, by E. H. Hankin, M.A.).

† *Annales de l'Institut Pasteur*, October, 1898.

‡ That insects do carry about the plague bacillus was proved by the experiments of Yersin and Nuttall on flies. The latter fed some flies on plague material and found the bacilli in their fæces. The former, at Hong-Kong, successfully inoculated an animal with plague from a fly. Hankin, too, in India found bacilli in the fæces of ants which had fed on rats that had died of plague. That plague can be conveyed by insects, therefore, there can be no doubt. Whether they ever actually insert the bacilli under the skin by means of their probosces there is at present no actual proof.

§ On the other hand, thousands of sacks of corn had been landed at Alexandria from Bombay in the early part of the year in which plague broke out in the former town.

All these are among the more immediate causes of plague epidemics, and all are practically beyond the reach of disinfectants. Indeed, in the presence of an epidemic it is difficult to see what effect disinfectants can possibly have except to lull people into a state of false security. Diminish in any degree the infection of the atmosphere they cannot. Lister found carbolic spray to be useless in destroying atmospheric microbes. *A fortiori*, it is impossible for an infinitesimal proportion of disinfectants entering the air by evaporation to have any effect on a microbe-laden atmosphere. If the microbes have any sense of humour they must laugh at our impotent attempts to annihilate them by such inefficient methods: squirting at an innumerable army of bacteria with carbolic acid, and only hitting a stray organism here and there by accident. Free access of air and flushings with water, and the removal of the favourite culture media of the organisms are the only weapons we can rely on. For the plague bacillus is saprophytic as well as parasitic, and we must not only break the chain of communication between living animals but sterilise the soil on which it can carry on an independent existence. For this purpose it would seem that the only successful plan is to compel all the inhabitants of an infected area to leave their homes and encamp in some open space. The roofs of the houses are then removed, and the whole infected area exposed to the prolonged action of air and sunshine. When the atmosphere has thus been purified, disinfectants may possibly be of some little use in destroying a few microbes which may remain in a latent condition about the floors and walls, but even mercuric perchloride has in many cases been found unsuccessful. This method, however, is a local one, adapted chiefly to India, and then only to the smaller towns and villages. Such a method would be of little use in England. Imagine, for instance, turning out by armed force the population of London to encamp, in winter, in some adjacent open country, and then exposing to air and sunshine the teeming army of flats and model lodging-houses, those perfect modern, stratified culture media for pathogenic organisms; the sunshine limited to about twenty-four hours per month at that, and the air constantly charged with moisture.

In the incidence of plague, as of other diseases, the personal element must always be considered. In the worst epidemics there are some who are insusceptible; those, presumably, who have led sanitary and well-regulated lives, free from excess or defect in all things, and with hereditary tendencies in their favour. The old history books tell us that in the great plague of London certain clergymen and physicians went about their usual work "as if they bore a charmed life"; and concerning the plague of Marseilles Pope inquires:—

> "Why drew Marseilles' good bishop purer breath,
> When nature sicken'd, and each gale was death?" *

It is impossible to tell how far the prevalence of an epidemic is due to the lives and condition of the inhabitants, but it is certain that individual susceptibility could be diminished by personal effort, and it is conceivable that the plague might enter a given area, affecting the water and the air (and the rats), and find no human subjects amenable to its influence; in other words, that we might live in an atmosphere loaded with pathogenic microbes, and snap our fingers at them.

On the other hand, some men, and classes of men, seem especially susceptible. In Egypt it is the Greeks, in India the Jains, wealthy, town dwellers and strict vegetarians: *verbum sap.*

In the recent epidemic, as in all recorded epidemics, the most prominent symptom has been the buboes, with fever, high pulse and respiration, followed by secondary glandular swellings and carbuncles from absorption. Pneumonic cases, that is cases which begin with pneumonia, are not usually followed by buboes; there is also, in many cases, inflammation of the throat and other organs, notably the spleen; the urine is of low specific gravity, contains albumen but no sugar. The nervous symptoms are due, as in the case of influenza, to the toxin produced by the bacillus. They consist of dreadful headaches, cramps, and sometimes coma. The extremely high pulse and respiration are also considered to be due to a temporary paralysis of the pneumogastric nerve.

---

* *Essay on Man*, epistle iv.

The bacillus of plague, discovered during the epidemic at Hong-Kong by Dr. Kitasato, a Japanese bacteriologist, is a short, constricted bacillus with rounded ends, staining deeply at the ends, usually less so in the centre; certain spots, which appear independently of staining, are considered to be characteristic of the Kitasato bacillus. Its shape, however, varies. It may assume, according to Dr. Balfour Stewart, either the above form, or a shorter one resembling a coccus or diplococcus. It is also sometimes found in pairs as a diplobacillus, and sometimes in short chains. The bacillus is found in the blood of fatal cases, in the sputum of pneumonic cases, and in buboes before suppuration.

The treatment of plague is extremely limited and very inefficacious. Powerful stimulants and tonics are alone of any value. Curative treatment by serum from horses' blood, the blood having been changed in character by numerous injections into the veins of cultures of the bacilli has been attempted with varying, but at present not very satisfactory, results, by Yersin, by Roux and by Lustig. The latest trial was at Oporto, where Yersin's serum was used, it is said with good results. Here, however, the epidemic has been generally somewhat less severe, the total mortality being comparatively low, and the number of cases too small to base any definite conclusions on. It has before been apparently successful in a few cases, and found wanting on a more extended trial.

Far otherwise is it when we come to the question of preventive inoculation. In the presence of an epidemic of plague, as we have seen, general sanitary measures come too late. In the presence of individual cases therapeutic treatment is of little use, and inoculative treatment has not been proved, at present, to be of any special value. There remains, however, the possibility of staying the plague, that is to say, of cutting off the supply of fresh cases by individual protective inoculation.

and this has been successfully accomplished by means of the prophylactic serum which has been discovered and employed on an extensive scale by Dr. Haffkine, the officer employed on bacteriological research duty by the Government of India.

Originally intended, I believe, to be employed as curative treatment, it has been largely and successfully used in India as a preventive. The inoculation experiments of Haffkine are well known through the reports of his communication on the subject to the Royal Society, but may perhaps be here briefly recapitulated as far as they refer to the disease we are now considering. The preliminary experiments were made on animals. Monkeys, rabbits and guinea-pigs were found susceptible, horses insusceptible, to the plague virus. But on inoculation with a plague culture in which the bacilli were destroyed by heat, the horses and rabbits became susceptible to a certain poisonous influence, the monkeys and guinea-pigs insusceptible. Immunity, too, varied in different animals. In some no immunity was produced by inoculation, in some a temporary immunity, in others a complete and permanent immunity, and in others, again, not only no immunity, but a positively increased susceptibility.

The serum was prepared by cultivating the bacilli in broth with a little oil or butter added ; the peculiar stalactite growth, as it is called, which ensues, being especially characteristic of this bacillus. The process is continued for about six weeks, and the bacilli then destroyed by heating to a temperature of about 150° or 160° F.

This serum was found in very small doses to confer on rabbits perfect immunity against the most potent inoculations, and a less complete degree of immunity on rats, mice, guinea-pigs and monkeys. The crucial test was then commenced on the human subject. In Byculla Jail 154 prisoners were inoculated, 183 remaining unprotected. Of the inoculated, three already had the disease on the day of inoculation, and died. Of the remainder, one was attacked the day after inoculation, and one on the seventh day—two in all. Both recovered.

Of the unprotected, twelve were attacked, of whom six died.

In Umerkadi Jail the daily average number of the inoculated was 147, of the unprotected, 127. Of the former three were attacked, and all recovered. Among the latter there were ten cases and six deaths. In Dharwar Jail there had been five cases, all fatal. The remaining prisoners, 373 in number, were then inoculated. This was followed by one case only, which recovered.

In the village of Undhera there had been seventy-nine deaths from plague. Inoculation was then performed on seventy-one, and sixty-four remained unprotected. Among the inoculated there were eight cases and three deaths. Among the unprotected, twenty-seven cases and twenty-six deaths.

At Dharwar, of a population of 38,210, 37,196 were inoculated. Of these thirty-seven only were attacked, while of the 1014 left unprotected 393 were attacked.

The net result Dr. Haffkine considers to be that the total mortality is diminished to the extent of between 80 and 90 per cent. by inoculation, and the actual case mortality by about 50 per cent.

The immunity conferred by inoculation is said to last six months.

The series of questions with which Dr. Haffkine set to work on his researches appears to have been satisfactorily answered. The replies would be as follows :—

1. That immunity is conferred on man as on the animals experimented on.

2. That the dose required is not too great to render the treatment applicable to man.

3. That a useful degree of immunity appears to be conferred twenty-four hours after inoculation.

4. That the immunity lasts six months.

5. That the resisting power is increased even during the fever and other symptoms produced by inoculation.

6. That even during the incubation stage of plague, inoculation appears to have a salutary effect, unless actual symptoms

of the disease have shown themselves within twelve hours after the operation.*

It remains to be proved by further experiment whether any form of inoculation will be found which will affect the course of the disease during the actual attack. Pending this consummation the treatment of plague is almost as negative and fruitless of results as it was in the seventeenth century.

---

* *Vide* Reports of the Meeting of the Royal Society on 8th June, 1899.

GENERAL PRACTITIONERS AND HOSPITAL ABUSE.

By MAJOR GREENWOOD, M.D., LL.B.

THE nineteenth century has been notable for many growths and developments, and in no department has growth been more remarkable than in our hospital system. It is true there were hospitals in the last century, and even at earlier periods. Many of the present institutions are considerably more than a century old; but what they were in their youth, or even in adolescence, formed but a faint criterion of their later development.

Charity is essentially a good thing, and no community can be the worse for it. In its proper sphere, like Mercy, "it blesses him that gives, and him that takes". But to do so it must be administered with care and discretion, or else it may be found to bless neither one nor the other. Indiscriminate doles are a curse to every population, and whatever shape they take, whether food, blankets, or medical attendance, nothing is more clearly proved by social science than that harm and not good is the inevitable result. Harm may be brought about in various ways, but it is not my intention to treat the subject from the standpoint of Political Economy: I intend to deal with only one phase of the mischief done by abuse of charity in our hospitals, and that, the harm done to the profession of medicine generally, a high degree of excel-

Numerals jump from 886 to 997.